R E P O R T R E S U M E S

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SUMMARY OF A PROJECT FOR COMPUTERIZED VOCATIONAL INFORMATION BEING DEVELOPED AT WILLOWBROOK HIGH SCHOOL, VILLA PARK, ILLINOIS.

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A COMPUTER BASED STORAGE AND RETRIEVAL SYSTEM HAS BEEN DEVELOPED FOR USE WITH VOCATIONAL TESTING AND OCCUPATIONAL DESCRIPTIVE DATA, BY HIGH SCHOOL STUDENTS. OCCUPATIONS ARE CLASSIFIED BY LEVEL OF TRAINING AND CATEGORIES OF INTEREST, COMPARED WITH STUDENT, CLASS RANK, COMPOSITE, TEST BATTERY, AND PREFERENCE SCORES. THE SYSTEM PROVIDES FOR STUDENT-COMPUTER CONVERSATIONS IN LOCATING OCCUPATIONAL DATA. STUDENT, COUNSELING, AND RESEARCH BENEFITS ARE DESCRIBED. HARDWARE, DATA, CONTENT, AND RESEARCH INFORMATION ARE BRIEFLY INDICATED. (MM)

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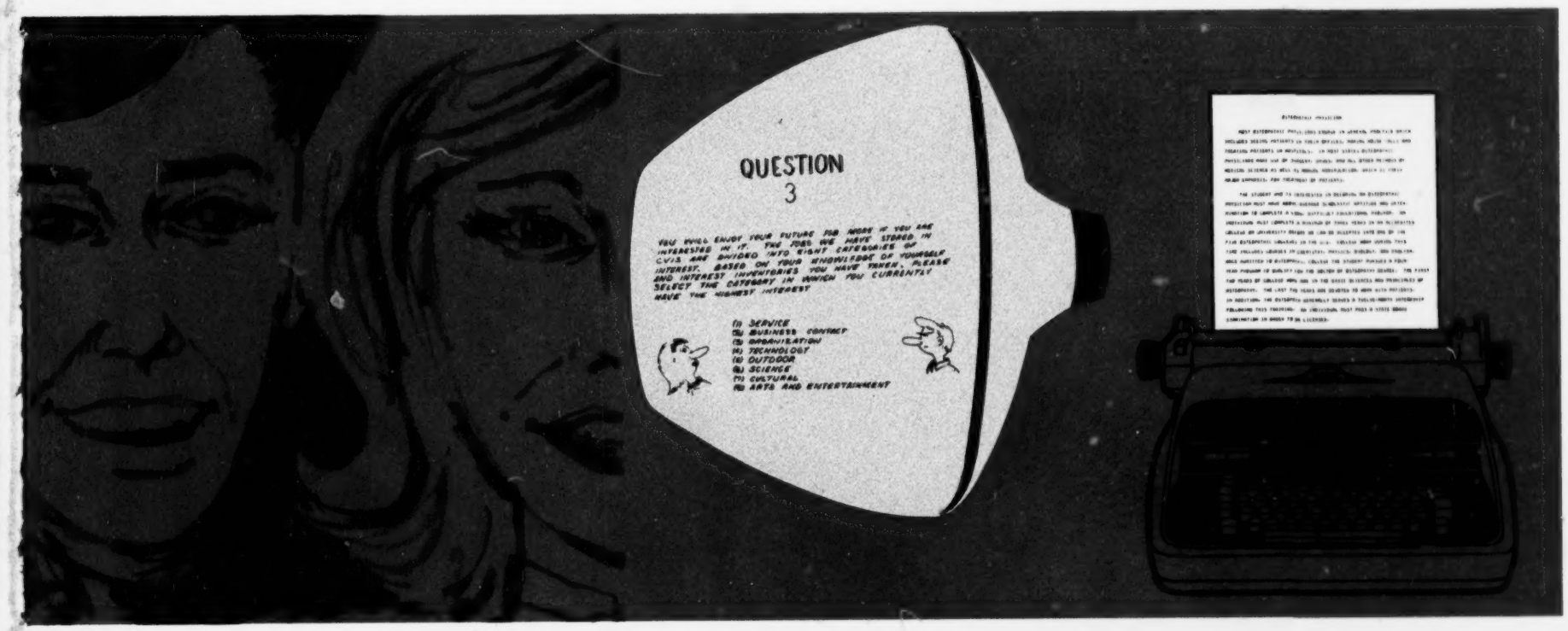
QUESTION
3
YOU WILL ENJOY YOUR FUTURE JOB MORE IF YOU ARE INTERESTED IN IT. THE JOBS WE HAVE STORED IN CVIS ARE DIVIDED INTO EIGHT CATEGORIES OF INTEREST. BASED ON YOUR KNOWLEDGE OF YOURSELF AND INTEREST INVENTORIES YOU HAVE TAKEN, PLEASE SELECT THE CATEGORY IN WHICH YOU CURRENTLY HAVE THE HIGHEST INTEREST
(1) SERVICE
(2) BUSINESS CONTACT
(3) ORGANIZATION
(4) TECHNOLOGY
(5) OUTDOOR
(6) SCIENCE
(7) CULTURAL
(8) ARTS AND ENTERTAINMENT

COMPUTERIZED VOCATIONAL INFORMATION SYSTEM

CVIS

EF 001 782

Summary of a Project

for

Computerization of Vocational Information

being developed at

Willowbrook High School
Villa Park, Illinois

Supported by a grant from the Research Coordinating Unit of the State of Illinois Board of Vocational Education and Rehabilitation.

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I INTRODUCTION

Willowbrook is a large, comprehensive high school of approximately 3200 students. It is located fifteen miles west of metropolitan Chicago, and it is one of three high schools in District 88. Approximately 60% of Willowbrook's graduates attend two and four-year colleges, and the remainder enters the local job market. The school, therefore, places a strong emphasis on trade, technical, and business courses as well as on its college preparatory curriculum.

The Guidance staff consists of eleven full-time counselors, including the Director, and a half-time psychologist. An increasing effort is being made to get vocational information to the students in a variety of ways and to acquaint both the counseling staff and the students with the excellent local job opportunities. We recognize that helping students make a good and successful vocational choice is one of the most difficult and complex facets of our work.

The project which will be described in the remainder of this report is designed to use computer technology as a tool to do a better job of systemetizing, retrieving, and applying masses of information for the purpose of helping the student make better-informed career and educational choices. The masses of information that will be harnessed are student personal data, occupational briefs, college information, trade-technical school-apprenticeship data, and local job opportunities. The system should be viewed as an automated library of information rather than as a decision-making mechanism. The system is also intended to provide for the student a model for decision-making which can be applied later in life. There is no intent to replace the counselor or to take away the personal touch. Rather the intent is to make accurate, updated, organized information readily available for human, professional consideration.

The major goals of the Project Committee are as follows:

1. To present to students expanded horizons of occupational possibilities.
2. To teach students valid methods of making decisions about vocational and educational choices.
3. To aid students to choose out of the vast number of possibilities those areas of work which best fit their abilities and interest.
4. To do the above in a unique way which will capture and hold student attention by developing personal involvement.
5. To make occupational information, including training opportunities, readily available to counseling and teaching staff.
6. To provide research data on factors involved in vocational decisions and job satisfaction.
7. To provide information about the range of local job opportunities.

II THE CLASSIFICATION OF OCCUPATIONS

After consideration of numerous systems of job classification, the Committee decided to use the two-dimensional classification system developed by Dr. Anne Roe, formerly of Harvard Graduate School of Education, and explained in her book *The Psychology of Occupations* (John Wiley & Sons: New York, 1956). Roe's classification divided occupations into six levels by amount of training required and degree of responsibility assumed by the worker. Briefly, the six levels are as follows:

Level 1: **Professional and Managerial 1.** This level requires high-level policy-making decisions and independent, varied responsibilities. If education is a relevant factor, it is at the doctoral level or equivalent.

Level 2: **Professional and Managerial 2.** The distinction between this level and the above is one of degree. These jobs may have autonomy, but the responsibility is less than in Level 1. These occupations normally require policy interpretation and education at or above the bachelor level, but below the doctoral.

Level 3: **Semi-Professional and Small Business.** These jobs have a low degree of responsibility for other people and application of policy or determination for self only. Education is normally high school plus technical school or the equivalent.

Level 4: **Skilled.** This and the following levels are classic subdivisions. Skilled occupations require apprenticeships or other special training experience.

Level 5: **Semi-skilled.** These occupations require some training and experience but markedly less than the occupations in Level 4. In addition, there is much less autonomy and initiative permitted in these occupations.

Level 6: **Unskilled.** These occupations require no special training or education and not much more ability than is needed to follow simple directions and to engage in simple repetitive actions.

Further, Roe divided occupations into eight categories of interest which are to some extent contiguously arranged. The eight interest categories are as follows:

1. **Service.** These occupations are primarily concerned with serving and attending to the personal tastes, needs, and welfare of other persons. Included are occupations in guidance, social work, domestic and protective services.

2. **Business Contact.** These occupations are primarily concerned with the face-to-face sale of commodities, investments, real estate, and services. Also included are such occupations as demonstrator, auctioneer, and some kinds of agents. A distinction is made in sales occupations between those in which the job is personal persuasion, which belong here, and those in which the selling is routine, and the person-to-person relation relatively unimportant, which belong in the next group.

3. **Organization.** These are the managerial and white collar jobs in business, industry, and government, the occupations concerned primarily with the organization and efficient functioning of commercial enterprises, and of government activities.

4. **Technology.** This group includes occupations concerned with the production, maintenance, and transportation of commodities and utilities. Here are occupations in engineering, crafts (including repair work), and the machine trades, as well as transportation and communication. Whether a physical scientist belongs in this group or in group 6 depends upon the setting in which he is working.

5. **Outdoor.** This group includes agricultural, fishery, forestry, mining and kindred occupations: the occupations primarily concerned with the cultivation, preservation and gathering of crops, of marine or inland water resources, of forest products, and other natural resources, and with animal husbandry.

6. **Science.** These are the occupations primarily concerned with scientific theory and its application under specified circumstances, other than technology.

7. **General Cultural.** These occupations are primarily concerned with the preservation and transmission of the general cultural heritage. The group embraces occupations concerning the subject usually called the humanities in college catalogues, but is broader than these. It includes occupations in education, journalism, jurisprudence, the ministry, linguistics, and so on. All elementary and high school teachers are included in this group. At higher levels teachers of science and art are placed in Groups 6 and 8.

8. **Arts and Entertainment.** These occupations include those primarily concerned with the use of special skills in the creative arts and in the field of entertainment. Both creators and performers are included.

At the time Roe published her book, she classified approximately 350 occupations in this way. In 1966, Dr. Roe and her associates at Harvard reworked the list of occupations in accordance with the new *Dictionary of Occupational Titles*, and the new list consists of 650 occupations. An example of the classification system follows:

LEVEL	SERVICE	BUSINESS CONTACT	ORGANIZATION	TECHNOLOGY	OUTDOOR	SCIENCE	GENERAL CULTURAL	ARTS & ENTERTAINMENT
I	PSYCHIATRIST PSYCHOLOGIST					ANTHROPOLOGIST OCEANOGRAPHER	ECONOMIST LAWYER	ARCHITECT
II	SOCIAL WORKERS COUNSELORS	PUBLIC RELATIONS WORKER	HOSPITAL ADMINISTRATOR, C.P.A.	AIRPLANE PILOT ENGINEER	SURVEYOR, LANDSCAPE ARCHITECT	NURSES, R.N. PHARMACISTS	CLERGYMEN, TEACHERS, H.S. & ELEM.	ACTOR ACTRESS DESIGNER
III	POLICE CHIEF, RECREATION WORKER	SALES, AUTO, INSURANCE	HOTEL MANAGER, STENOGRAPHER	DRAFTSMAN, FLIGHT ENGINEER	FOREST RANGER, COUNTY AGENT	DENTAL HYGIENIST, X-RAY TECHNICIAN	RADIO ANNOUNCER, T-V ANNOUNCER	INTERIOR DECORATOR, PHOTOGRAPHER
IV	POLICEMEN, PRACTICAL NURSES	DRIVER-SALESMAN	BOOKKEEPER SALESCLERKS	ELECTRICIAN JEWELER	FORESTRY TECHNICIAN, MINER	LAB TECHNICIAN, OPTICIAN		LETTERER, PASTE-UP MAN
V	TAXI DRIVER, WAITER		TYPISTS, CASHIERS	TRUCK DRIVER PLASTERER	CHAINMAN, ROUSTABOUT			
VI	ORDERLY, BELLMAN		MAIL MACHINE OPERATOR, SORTING MACH. OP.	BULLDOZER OPERATOR, CEMENT MASON	ROUSTABOUT, LUMBERJACK			PINBOY

III RELATIONSHIP OF THE STUDENT RECORD

Given this two-dimensional classification system, the Willowbrook Committee began to study the ways in which objective data available about every student could be related to it. It was decided to put student permanent records in computer storage, so that parts of the record can be used in helping a student make realistic vocational choices. In beginning operation, the committee decided to make use of cumulative class rank, composite score on a battery of tests, and an interest inventory, possibly the Kuder Preference Record. After data are gathered over years of experience, other items on the student record, such as grades in specific courses and personality ratings, may be used. The battery of tests which will be administered to sophomores yields a verbal and non-verbal ability score and six achievement scores (mathematics, science, reading, English, Social Studies, Solving Everyday Problems). The relationship of data to Roe's six levels will be as follows:

CUMULATIVE RANK IN CLASS		1	2	3	4	5	6	7	8	COMPOSITE TEST BATTERY SCORE (%)
TOP ONE QUARTER	I									TOP QUARTILE (75-99%)
1ST - 2ND QUARTER	II									1ST - 2ND QUARTILE (51-99%)
2ND - 3RD QUARTER	III									2ND - 3RD QUARTILE (26-75%)
2ND - 3RD QUARTER	IV									2ND - 3RD QUARTILE (26-75%)
3RD QUARTER	V									3RD QUARTILE (26-50%)
4TH QUARTER	VI									4TH QUARTILE (1-25%)
KUDER		SOCIAL SERVICE	PERSUASIVE	CLERICAL COMPUTATIONAL	SCIENTIFIC MECHANICAL COMPUTATIONAL	OUTDOOR	SCIENTIFIC	LITERARY	ARTISTIC MUSICAL LITERARY	

The computer will be instructed to use the higher of the two criteria (rank or composite score) for its reactions, which will be explained later, in case of discrepancy. Should the test score be considerably higher than rank in class, the computer will call this to the attention of the student.

IV THE STUDENT EXPERIENCE

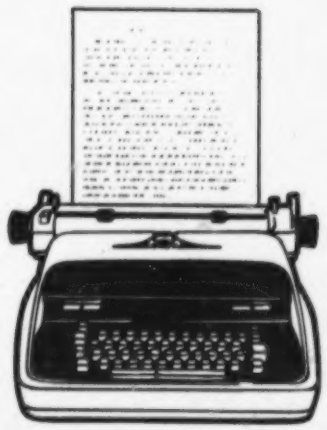
Before the student comes to the computer equipment, he will have orientation to the classification system in a vocational unit in sophomore English classes. The six levels of training will be described to him in detail. The meaning of the eight interest categories will be explained and supplemented by audio-visual aids and guest speakers.

Sophomores, juniors and seniors will be invited to use the computer system on a voluntary basis during their free time. The student terminals will consist of a cathode ray tube and an automatic typewriter. A third-generation computer system will allow as many as 16-20 such student terminals on one central processing unit.

When the student comes to this terminal equipment, he will first be asked to type in his student number. When he does so, the computer recalls for its use the student's permanent record. Messages to the student which should be kept by him will be typed to him on the typewriter, which types at 180 words per minute. The "conversation" will be flashed on the cathode ray tube, and the student will respond by selecting multiple choice answers.

CVIS

In order to acquaint the student with the use of the gadgetry, the computer will invite the student to a game of tic-tac-toe. It will then carry on a conversation with the student in which the following four questions are asked:



1. Choice of occupation is related to your ability to learn. How do you rate yourself on ability to do school work compared to the rest of your class?

   1. Top Quarter
   2. Second Quarter
   3. Third Quarter
   4. Bottom Quarter

Computer reaction to Question 1.

1. *Information in your record agrees with your self-rating.*

2. *Information in your record indicates that you are in the _____ quarter of your class at Willowbrook. You may wish to discuss this rating with your counselor. The computer will proceed on the basis of the information in your record.*

2. Grades in school are also related to your vocational choices. Think about your semester grades in all subjects since you entered Willowbrook, and indicate where you think you stand in relation to the rest of your class on grade average.

   1. Top Quarter
   2. Second Quarter
   3. Third Quarter
   4. Bottom Quarter

Computer reaction to Question 2.

1. *Information in your record agrees with your self-rating.*

2. *Information in your record places you in the _____ quarter of your class based on your grade point average at the end of last semester. The computer will proceed on the basis of information stored in your record.*

3. You will enjoy your future job more if you are interested in it. The jobs we have stored in CVIS are divided into eight categories of interest. Based on your knowledge of yourself and interest inventories you have taken, please select the category in which you currently have the highest interest:

   1. Service
   2. Business contact
   3. Organization
   4. Technology
   5. Outdoor
   6. Science
   7. Cultural
   8. Arts and Entertainment

Computer reaction to Question 3.

1. *The results of the interest inventory which you have taken agree with your choice.*

2. *The interest inventory which you have taken indicates that your highest areas of interest are _____, _____, and _____. You may, however, look at the occupations in the interest area which you just chose.*

4. **Keeping in mind your abilities and interests, you must now make some decisions about your plans after high school. The kind of occupation you will be able to pursue depends largely upon the amount of education or training you are willing to get. Please indicate the category which best describes your present educational plans:**

1. No further training after high school.
2. Some training (2-6 months) after high school.
3. Trade school (6-18 months) or apprenticeship.
4. Technical school (6-18 months) or junior college technical program (2 years)
5. Four years of college.
6. Advanced degrees beyond college.

Computer reaction to Question 4.

O.K. message: The level of education which you have chosen seems realistic in the light of your record.

Minor discrepancy: Your record indicates that you could undertake a higher level of education than you have chosen. You may wish to discuss this with your counselor. You may, however, look at the jobs in the category you have chosen.

OR

The level of education you have chosen may be quite difficult for you unless your grades begin to improve in high school. You may want to discuss this with your counselor. You may, however, look at the jobs in the category you have chosen.

Major discrepancy: Your choice isn't realistic in the light of your present record. Please see your counselor. After a conference with him or her you may use this system again.

The script for the computer "conversation" is longer than quoted here. The Project Director tested the script with a group of students and altered it in accordance with their reactions to it. The computer's reactions are based on the decision table below:

QUARTER	O.K.	MINOR DISCREPANCY	MAJOR DISCREPANCY
1	I & II	III & IV	V & VI
2	I, II, III	IV & V	VI
3	III, IV, V	II & VI	I
4	IV, V, VI	III	I & II

Once the student has made a selection of interest category and training level, the computer chooses a "box" of occupations for him. The number of occupations in that box varies from none to as many as one hundred fifteen. The typewriter types out this list of occupations for the student. At this point the student may choose to explore occupations on that list or to go back and make different decisions about interest and education, which will produce a new list for him. If he chooses to explore occupations on the list he has, he is asked to type in the number of the first occupation. As soon as he does so, a fifty word definition of the occupation flashes on the screen. He may then ask for further information about that same occupation, begin to explore another on his list, or go back and make different decisions about education and interest. If he chooses to request additional information about the same occupation, the typewriter types a 250-300 word description. The format of these descriptions will be standard, including job duties, training requirements, recommended high school courses, working conditions, beginning salary range, and employment outlook. At the end of each description, reference will be made to sources of further information. The fifty-word definitions will be those which appear in the *Encyclopedia of Careers*, published in 1967 by the J. G. Ferguson Publishing Company of Chicago. This same company is preparing the 300-word job descriptions for Willowbrook without charge.

The student may then continue this process as long as he has time and interest. After the student has used the system once, he will not again play the game of tic-tac-toe or go through the self-evaluation. Rather, the computer will respond, "The last time you used CVIS (Computerized Vocational Information System) you were exploring jobs in the area of Science (flashing list on the screen). Do you want to continue exploring this list, or do you wish to make different decisions about interest and training?" The student may also recall any single job description by typing in the code number of that occupation.

V FURTHER DEVELOPMENTS

In another phase of development other types of information will be stored in the data bank to be accessed by students in the same conversational mode. This information would be primarily intended for juniors and seniors. The following is a summary of plans for future developments:

For students exploring occupations in:	Computer System will provide:
Levels I & II	1. Decision-making conversations about college (cost, distance from home, size, major fields, control, etc.).
	2. List of suggested colleges for investigation, based on the above decisions, student record, and testing information.
	3. Sources of scholarship aid if needed, based on student record.
Levels III & IV	1. Information about technical programs in local College of Du Page.
	2. Information about trade and technical schools within 100 mile radius.
	3. Information about local apprenticeships.
Levels V & VI	1. Information about how to choose your first job – gaming approach.
	2. List of companies in Du Page County which hire high school graduates (or leavers) in the field of interest specified by the student.

VI COUNSELOR BENEFITS

By means of a terminal hook-up to the computer, counselors and other pupil personnel workers can have access to any information stored in the data bank. By typing in specified code numbers, the counselor can recall information about the 650 occupations, over 3000 colleges, scholarships, local technical and trade schools, local entry jobs, and any student's total school record. We are currently expanding our traditional student permanent record to include such items as health disabilities, discipline record, record of work skills and experience, and information about the student gained from one and five-year follow-up studies. The counselor will also be able to recall the path of decision-making followed by each of his counselees. Part of this student record will be printed out for transcripts and other purposes. Some blocks of it will never be printed out, and only designated professional personnel will have access to it.

Also the computer will print out for counselors daily a list of counselees who have received minor and major discrepancy messages on the system during that day.

VII EVALUATION AND RESEARCH

A block of computer storage space will be set aside for data which will provide evaluation of the project. Such data as the following will be stored:

1. The number of times a student makes different decisions about level of education and interest area during his high school career.

2. The number of minor and major discrepancy messages given.

3. The result of these messages, ie, do they cause students to move toward more realistic goals?

4. The last 10 occupations explored in depth by each student. This can be compared with results of one and five-year follow-up studies to see to what degree the system is helping students to choose an occupation.

5. The number of times each occupation is explored by students.

6. The number of times each student uses the system.

The Committee has given much thought to the inclusion of the kinds of data which will be needed for evaluation and research. A consultant will be engaged to design a plan for evaluation. The evaluation will include:

1. Student reaction questionnaire.
2. Student interviews.
3. Counselor reaction questionnaire.
4. Control group approach.
5. Short and long-term follow-up studies.

The Willowbrook Committee hopes to have its vocational information system ready for beginning operation with students in January, 1969. Additional programs for college, technical school, and job selection will be added for the school year 1969-70.